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on the ground, and they showed so little fear that it was possible to approach within a few feet of them, and when one got too close they would only fly up into the trees nearby. They kept up an incessant soft twittering noise, and for several days we had excellent opportunities for observing them at close range, until the throwing of some apples into their midst caused them to fly off, and they did not return before we left. Nine specimens were preserved, nos. 17362-17370.

Vireo huttoni. Hutton Vireo. Only seen once at Helena, mingling with a flock of chickadees.

Thryomanes bewicki drymoecus. San Joaquin Wren. Not at all common; specimen taken at Helena, no. 17372, is slightly darker than average *drymoecus*, being somewhat intermediate towards *calophonus*.

Baeolophus inornatus inornatus. Plain Titmouse. Several noted at Tower House.

Penthestes rufescens rufescens. Chestnut-backed Chickadee. Quite common at Helena.

Chamaea fasciata henshawi. Pallid Wren-tit. Less numerous at Helena than Tower House, where their song was most noticeable on bushy hillsides. A series of fourteen was taken, nos. 17376-17389. It is interesting to note that these are the very light interior form rather than, as would seem more natural, the darker coast form.

Psaltriparus minimus minimus. Bush-tit. One flock was seen at Tower House and three specimens were taken. Near topotypes examined, from Salem, Oregon, show a light pileum but the back and breast not appreciably so. Specimens from Pasadena have pileums as light as the topotype; but others are dark and in no case does a decidedly light back accompany the light pileum. Specimens from Horse Creek, Siskiyou Mountains, have a dark pileum like that of those from Tower House, so that, with such a range of variation, it would seem the more reasonable course at the present time to consider the sub-species *californicus* is not well established.

Regulus calendula. Ruby-crowned Kinglet. Not common at either locality.

Myadestes townsendi. Townsend Solitaire. Numerous at Tower House.

Hylocichla guttata nana. Dwarf Hermit Thrush. Seen quite often, so considering their retiring habits they must have been quite common.

Planesticus migratorius propinquus. Western Robin. Common at both localities.

Ixoreus naevius. Varied Thrush. Quite common at both localities, with robins, but not as easily approached.

Sialia mexicana occidentalis. Western Bluebird. Large flocks seen at Tower House.

NESTING NOTES ON THE DUCKS OF THE BARR LAKE REGION, COLORADO

By ROBERT B. ROCKWELL

PART I

THE most important subject which confronted us, when we began a three years' study of the nesting birds of the Barr Lake country north of Denver, was that of determining the status of the different species of ducks as

breeders.* Definite information on the subject, covering the plains region east of the foothills, was practically a negligible quantity. The general impression conveyed by text-books was that the extreme southern limit of the breeding range of most of the ducks lay far to the north of Colorado. Cooke in his final supplement of "Birds of Colorado" gave the first published intimation that this range might eventually be extended far to the south, and our work in this section verified the intimation.

The results of systematic work brought to light many interesting and confusing facts, for we not only encountered many new peculiarities in nesting habits, but were also fortunate enough to collect data which established two species as breeders, whose status had heretofore been undetermined. A few species, e. g., the Mallard, Blue-winged and Cinnamon Teal, Baldpate, Shoveller, Gadwall and Ruddy Duck had already been definitely established as breeders on the plains. Of these we found the two species of teal nesting commonly, in fact the Blue-wings might be



Fig. 37. NESTING SITE OF MALLARD ON MUSK-RAT HOUSE

considered abundant breeders; the Ruddy a rather uncommon breeder; persistent searching netted us only two nests of the Mallard and one of the Shoveller, although the birds were present in considerable numbers throughout the nesting season; and the most careful field work failed to reveal a single nest of the Baldpate or Gadwall, although these birds were also fairly common. The Green-winged Teal was seen in some numbers, but we found only one nest which we could assign positively to this species.

One of our most interesting discoveries was that the Pintail, which had hitherto been considered a rather rare breeder in the state, was, next to the Blue-winged Teal, the most common breeding duck in the Barr Lake country.

The most important result of our work, however, was in establishing the Red-head and the Canvasback among Colorado breeding birds. In order to prevent repetition it will no doubt be advisable to arrange the data according to species, rather than to treat the various ducks indiscriminately. In the following notes

* All the notes upon which this paper is based were taken in company with L. J. Hersey.

several species are omitted, as I have endeavored to include in these notes only such data as will add to the general fund of information on this subject.

MALLARD (*Anas platyrhynchos*)

During our numerous trips through the Barr Lake district we found the Mallard one of the commonest ducks. A very large flock wintered on the larger lakes; during spring and fall migration flocks of Mallards were always in evidence, and during the summer months pairs and single birds were quite common. It was therefore rather surprising that despite careful and persistent searching, we found but two nests of this species during three seasons' work. Both of these, however, were quite out of the ordinary and are worthy of description.

On May 11, 1907, while wading out from shore through a sparse, burnt-over



Fig. 38. MALLARD'S NEST ON MUSK-RAT HOUSE, SHOWING DETAILS OF NEST CONSTRUCTION

growth of cat-tails, skirting a small lake, a female Mallard flushed noisily from a large musk-rat house and revealed a beautiful set of eleven eggs deposited in a hollow, scraped in the dead cat-tails and debris forming the house, and well lined with down. The house was very conspicuous, standing over two feet above the surface of the water surrounding it, and the nest was an open one as can plainly be seen from the accompanying illustration (Fig. 37). There was no apparent attempt at concealment. The female flushed when we were fully thirty yards from the nest, and the male swam about well out of gunshot.

A week later (on the eighteenth) we succeeded in approaching to within ten feet of the brooding female, who was in plain sight even from a considerable distance. The nest was in much the same condition as on the preceding visit, but the downy lining was much less in evidence. On the twenty-fourth we found that

the musk-rats had been adding to the house, with the result that the mother bird, in order to keep her treasures from being buried, had been forced to move her nest over toward the edge of the pile. In fact four of the eggs were missing on this date, and we surmised that they had been pushed off into the water during the moving process. A week later (May 31) the house had been built up much higher, and the nest was on the ragged edge of the pile with the eggs apparently far advanced in incubation. On June 8 the eggs had been hatched, and in our examination of the nest we were surprised to find the four missing eggs deeply buried in the debris at almost the exact spot where the nest was located when first found.

A fascinating bit of the family history would have undoubtedly been revealed had we been enabled to observe the attitude of the busy musk-rats toward the brooding mother bird, and the process of moving the nest.

The second nest was found June 13, 1908, over a month later in the spring than the first nest was found. Some slight experience with nesting Mallards in Nevada had taught me to look in high and dry locations for their nests and I was therefore greatly surprised to have a female Mallard flush from almost beneath my feet while crossing a low swale. The nest was built in rather a dense growth of dead cat-tails, tender green shoots and scattered young willows on ground formerly swampy, but at that time almost dry. It was a beautifully built basket-like structure of dried cat-tail blades with very little of the usual down in the lining, and remarkably well concealed. We passed within three feet of the brooding female at least twice before she flushed. During the following week the district was visited by a heavy hailstorm and on our next visit we found that the marsh had filled with water and that the nest had been drowned out and deserted.

BLUE-WINGED TEAL (*Querquedula discors*)

By far the most abundant nesting duck throughout the Barr district was the pretty little Blue-winged Teal. No matter what type of ground our searches carried us over, we were sure to be startled by the occasional flutter of wings, as a dainty little gray-clad mother left her nest like a flash upon our too close approach. We found nests of these birds in the dense cat-tail growth along sloughs, on the soggy, spongy seepage ground under the big dykes, at the edge of beaten paths near the lake-shore, by roadsides back from the water, among the dry weeds and sand of the prairie, far from the water's edge, amid the dense rank grass on a tiny island, in alfalfa fields, on grassy flats, and in cavities in and upon musk-rat houses.

The nests exhibited a wide diversity in construction. The predominating type was a neat basket-like structure composed of fine soft dead grass, sometimes set well into a dense clump of rank grass on the surface of the ground, and sometimes sunken into a cavity until the top of the nest was flush with the surface of the ground. These nests were usually liberally lined with down; much thicker on the sides and rim of the nest than on the bottom. In fact several were examined which had no down whatever underneath the eggs. The quantity of down varied greatly in different nests, but apparently increased in quantity as incubation advanced.

A less common type of nest was made entirely of bits of dead cat-tail blades deep-set into a cavity in the ground. This type of nest was usually found in marshy places, where this material was more available, and in these there was much less of the downy lining. The concealment of these nests was likewise less effective, and taken as a whole this type of nest was altogether inferior. We found a few built in wet places where the foundation of the nest was actually wet, but we did

not find a single nest where the eggs were the least bit damp; and the large majority were in perfectly dry locations in close proximity to water.

The concealment of the better built nests, especially those in the center of a tussock of rank grass, was well nigh perfect; in fact in most cases we were unable to see either the brooding bird or the eggs from a distance of five or six feet even when we knew the exact location of the nest. Upon leaving the nest during incubation the parent covered the eggs with the downy rim of the nest and the concealment thus afforded was remarkable.

We found nests exhibiting every possible degree of skill in construction, but whether the nest was a rude affair of grasses and trash scraped into a little hollow in the ground; or whether it was a beautifully woven basket-like structure deeply set into a soft cradle of rich grass, and luxuriously lined with an abundance of soft gray down from the parent's breast, we invariably encountered the strong mother instinct characteristic of all wild ducks. The brooding parent seldom left her nest until we were within three or four paces of her, and often we approached to within arm's length. In one instance where the parent had become somewhat accustomed to me I actually touched the bird's back before she flushed.

Several farmers living near the lakes told us of killing or maiming the brooding birds with mowing machines while cutting the first crop of alfalfa. This remarkable attachment to the nest is all the more wonderful when one considers the difficulty of getting within gunshot of these birds during the open season, which in Colorado extends to April 5, scarcely more than a month before the birds begin to lay. It is, however, very interesting to note how quickly all the ducks (and more particularly the teal) recognize the protection of the closed season. Late in May one may stroll along the shores of the smaller lakes and watch from one to five hundred ducks swimming about within a hundred yards or so, without exhibiting any particular fear of the intruder, whereas six weeks earlier his distant appearance would be greeted with a roar of wings.

Several radical departures from the characteristic habits were encountered.

One bird had built her nest on a little flat amid some short blue grass which afforded her no concealment whatever. As she brooded her eggs she was plainly visible at a distance of twenty yards or more. She allowed me to approach to within four or five feet and set up my camera for an exposure; and then instead of springing lightly into the air as usual, she ambled awkwardly off the nest, waddled slowly between the legs of my tripod, uttering lazy little quacks of protest, and finally after walking a distance of thirty yards or more took flight.

While ploughing our way through a dense cat-tail swamp in water above our knees we frightened a teal from a nest in a musk-rat house. A careful search finally revealed the eggs fully a foot back from the entrance of a deep cavity in the side of the house. To our surprise the nest contained four eggs of the teal and five eggs of some big duck, all of which were incubated.

Another queer nest was found, which was a shallow depression on the side of a dilapidated musk-rat house, which had been originally built between a fence post and its diagonal brace. The lower barbed wire of the fence prevented the top of the house from collapsing, while the side weathered away, leaving a cavity well protected by the overhanging top. In this cavity without a sign of lining or a bit of concealment lay the ten conspicuous white eggs. They could be readily seen from a distance of twenty yards.

Another beautifully built and concealed nest with eleven eggs was just a fraction less than three feet from a nest where a patient little mother Spotted Sandpiper brooded her four eggs.

One set of nine eggs in a beautifully built nest at the side of a neglected road was visited by some animal which had made a small hole in the side of each egg and had sucked the contents.

The Blue-winged Teal are among the last ducks to arrive from the south in the spring, seldom being seen in any numbers before April first, and the great bulk of the birds arrive about the middle of April. The birds are mated, and the flocks for the most part scattered by the middle of May, and the first signs of nesting are usually found during the third week in May. The earliest complete set found by us was a beautiful set of eleven eggs on May 24, 1908. This nest must have been completed and laying begun by May 13. The average date for complete sets is about June 1. We found complete sets of fresh eggs as late as July 21, from which we infer that a second set is laid when the first one is destroyed. The



Fig. 39. NESTING SITE OF CINNAMON TEAL, SHOWING METHOD OF CONCEALMENT

majority of sets watched by us hatched during the third week in June, but two nests were found from which the young had gone by June 8.

We tried repeatedly to satisfy ourselves that an egg was deposited each day, and finally on June 11 a nest was found containing one egg, and seven days later the same nest contained eight.

The birds were very sensitive to any disturbance of the eggs and on this account we did not dare to handle or touch them, except when absolutely necessary. This prevented us from ascertaining whether or not incubation began after the first egg was laid; but from the fact that the entire clutch usually hatches on the same day and the young ones leave the nest as soon as they are dry, it is highly improbable that the female undertakes the duties of incubation until the comple-

ment is complete. In fact we seldom flushed the parent bird from nests containing incomplete sets, although a good many such were found.

Complete sets ranged in number from seven to twelve. The sixteen nests of which we kept a definite record contained the following sets: one of twelve, six of eleven, one of ten, two of nine, five of eight, and one of seven. These were only a fraction of the total number of nests found, but a fair estimate of the average clutch in all the nests examined would be nine or ten eggs.

The first brood of young birds was found June 22, and on July 5 and 6 several broods of half grown young were seen. The hiding instinct of the ducklings during the downy period is little short of miraculous. One fond mother bird which flushed almost from between my feet in a wet grassy meadow left eight tiny brown balls of down in plain sight within arm's length of me; yet after they had scamper-



Fig. 40. THE SAME NEST AS THAT SHOWN IN FIG. 39 WITH CONCEALING
VEGETATION REMOVED

ed to shelter fifteen minute's careful search brought to light only three babies, although I knew that the remaining five must be hiding within a radius of four or five feet.

When flushed from a brood of young ones the mother bird employs all the arts known to birddom to entice the intruder away from her babies; fluttering through the grass, feigning a broken wing, and uttering low cries, utterly un-duck-like in tone.

The mother duck stays with her brood at least until they are full grown and on the wing. One devoted mother who was surprised by us in a narrow lagoon with her brood of five three-fourths grown ducklings, courageously swam back and forth in front of us, and not twenty-five feet distant, endeavoring to distract our

attention from her charges, while the youngsters, instead of scurrying to shelter seemed rather to enjoy the anxiety of the mother and the excitement of our intrusion.

The young birds learn to fly very slowly, and the shameful slaughter of "flappers" (as the young are called when unable to fly) upon the opening of the hunting season September 10, is another testimonial of the legislative farce of game laws framed by politicians.

CINNAMON TEAL (*Querquedula cyanoptera*)

Owing to the strong resemblance between females of the Blue-wing and Cinnamon Teal, and the rapidity with which they left the nests when flushed, it was extremely difficult to identify the birds as they took flight. We were consequently much handicapped in our study of the Cinnamon Teal, and the total number of nests positively identified as belonging to this species was only four, although we undoubtedly examined many others belonging to this species without being able to identify the parent beyond doubt.

This small amount of data is altogether insufficient to warrant any general statements, but in the four nests examined we were unable to detect any radical departures from the habits already attributed to the Blue-wings except that two of the four nests were in very wet locations, where the eggs were in constant danger of becoming damp. These two nests were practically devoid of the downy lining while the other two nests, which were built in perfectly dry locations were warmly lined with down. The handsomest nest of the four, which was one of the nests on wet ground, was figured in the CONDOR (Vol. XI no. 4, page 112.) and contrasts sharply with the one shown in the accompanying cut, which is one of those in a dry location.

One of the nests was on dry prairie fully one hundred feet back from the shore of the lake amid a fairly thick growth of weeds and grass. This nest which was found May 30, 1908, was well built and warmly lined with down, and the bird was quite fearless. We watched the nest closely and on June 19 were surprised to find that seven of the young birds had pecked through the shell, but had died before clearing the shell around their heads. The other four eggs contained perfectly formed dead embryos which had not begun to pip the shells.

The male birds, however, in their brilliant cinnamon coats were very conspicuous and we were occasionally able, through their actions, to connect them with the nests we had under examination.

Male Cinnamon Teal were common throughout May and continued to increase in number until June first, and during this month they were seen in large numbers. In fact we arrived at the conclusion that they were breeding throughout the Barr district in probably half the numbers that the Blue-wings were, and we regretted exceedingly that the peculiar resemblance between the two species prevented us from gathering sufficient information to establish any peculiarities in nesting habits that might exist, but this would only have been possible by collecting an extensive series of the birds as they flushed from the nests; a proceeding which we considered altogether unwarranted.